

**DIVISION 7**

**LANDSCAPING AND IRRIGATION**

## SECTION 07100

### DESIGN STANDARDS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Procedures for Landscape and Irrigation Design

##### 1.02 RELATED WORK

- A. Section 07200: Grading for Landscaping
- B. Section 07300 Pressurized Irrigation Systems
- C. Section 07400: Seed, Turf Seed, and Turf Sod
- D. Section 07500: Trees, Shrubs, & Groundcover
- E. Section 07800: Topsoil
- F. Section 01620: Storage and Protection

#### PART 2 PRODUCTS Not Used

#### PART 3 EXECUTION

##### 3.01 PROJECT DATA SHEET

Project data sheet shall include the following

- 1. Project name and address
- 2. Landscape Designer/Landscape Architect's name, address, phone and fax number

##### 3.02 PLANTING PLAN

A detailed Planting Plan shall be drawn at a scale (not more than 1"=30') that clearly identifies the following:

- 1. Location of all plant materials, a legend with botanical and common names, quantity, and size of plant materials
- 2. Property lines and street names
- 3. Existing and proposed buildings, walls, fences, light poles, utilities, paved areas and other site improvements
- 4. Existing trees and plant materials to be removed or retained
- 5. Designation of Landscape Zones

##### 3.03 IRRIGATION PLAN

A detailed Irrigation Plan shall be drawn at the same scale as the planting plan and shall contain the following information:

- 1. Layout of the irrigation system and a legend summarizing the type and size of all components of the system, including manufacturer name and model numbers
- 2. Static water pressure in pounds per square inch (psi) at the point of connection to the public water supply
- 3. Flow rate in gallons per minute and design operating pressure in psi for each valve and precipitation rate in inches per hour for each valve with sprinklers.

##### 3.04 GRADING PLAN

A Grading Plan shall be drawn at the same scale as the Planting Plan and shall contain the following information:

- 1. Property lines and street names, existing and proposed buildings, walls, fences, utilities,

2. paved areas and other site improvements
2. Existing and finished contour lines and spot elevations as necessary for the proposed site improvements

### 3.05 SOILS REPORT

- A. A Soils Report will be required where irrigated landscaped areas consisting of grass or similar turf exceed 33% of the overall landscaped area. The Soils Report shall describe the depth, composition, and bulk density of the top soil and subsoil at the site, and shall include recommendations for soil amendments. The Planting Plan shall incorporate the recommendations of the Soils Report into the planting specifications
- B. The soils report shall be acquired during the design phase of projects.

### 3.06 LANDSCAPE WATER ALLOWANCE

The annual Landscape Water Allowance shall be calculated using the following equation:

$$\text{Landscape Water Allowance} = \text{ETO} \times 1.0 \times 0.62 \times A$$

Where Landscape Water Allowance is in gallons per growing season

- ETO = Reference Evapotranspiration in inches per growing season  
1.0 = ETO adjustment factor, 100% of turf grass ETO (growing season adjustment factor)  
0.62 = conversion factor  
A = total Irrigated Landscape Area in square feet

### 3.05 IRRIGATION SCHEDULE

A monthly Irrigation Schedule shall be prepared that covers the initial 90-day plant establishment period and the typical long-term use period. This schedule shall consist of a table with the following information for each valve:

1. Plant type (for example, turf, trees, low water use plants)
2. Irrigation type (for example, sprinklers, drip, bubblers)
3. Flow rate in gallons per minute
4. Precipitation rate in inches per hour (sprinklers only)
5. Run times in minutes per day
6. Number of water days per week
7. Cycle time to avoid runoff

### 3.07 LANDSCAPE DESIGN STANDARDS

- A. Plant Selection.
  1. Plants selected for landscape zones shall consist of plants that are well-suited to the microclimate and soil conditions at the project site. Plants with similar water needs shall be grouped together in landscape zones as much as possible.
  2. For projects located at the interface between urban areas and natural open space (non-irrigated), Extra-Drought Tolerant Plants shall be selected that will blend with the native vegetation and are fire resistant or fire retardant. Plants with low fuel volume or high moisture content shall be emphasized. Plants that tend to accumulate excessive amounts of dead wood or debris shall be avoided.
  3. Areas with slopes greater than 30% shall be landscaped with deep-rooting, Water Conserving Plants for erosion control and soil stabilization. Irrigation devices are limited to drip emitters, bubblers or sprinklers with a maximum

- precipitation rate not to exceed 0.85 inches per hour.
- 4. Park strips and other landscaped areas less than eight [8] feet wide shall be landscaped with Water Conserving Plants and/or grass.
- B. Mulch.  
All irrigated non-turf areas shall be covered with a minimum layer of four [4] inches of Mulch to retain water, inhibit weed growth, and moderate soil temperature. Non-porous material shall not be placed under the mulch.
- C. Soil Preparation.  
Soil preparation shall include scarifying the soil to a minimum depth of six [6] inches and amending the soil with organic material as per specific recommendations based on the Soils Report.

### 3.08 IRRIGATION DESIGN STANDARDS

- A. A landscape water meter and backflow prevention assembly for landscaping that are in compliance with state code shall be installed after the City meter and outside the City maintained meter box on the customer's service line. The size of the meter shall be determined based on irrigation demand.
- B. A pressure regulating valve shall be installed and maintained by the consumer if the static service pressure exceeds 80 pounds per square inch (psi). The pressure-regulating valve shall be located between the landscape water meter and the first point of water use, or first point of division in the pipe, and shall be set at the manufacturer's recommended pressure for sprinklers.
- C. Automatic Controller
  - 1. All irrigation systems shall include an electric automatic controller with multiple program and multiple repeat cycle capabilities and a flexible calendar program.
  - 2. All controllers shall be equipped with an automatic Rain Shut-off Device.
- D. On slopes exceeding 30%, the irrigation system shall consist of Drip Emitters, Bubblers, or sprinklers with a maximum Precipitation Rate of 0.85 inches per hour and adjusted sprinkler cycle to eliminate Runoff.
- E. Each valve shall irrigate a landscape zone with similar site, slope and soil conditions and plant materials with similar watering needs. Turf and non-turf areas shall be irrigated on separate valve(s).
- F. Drip Emitters or a Bubbler shall be provided for each tree where practicable. Bubblers shall not exceed 1.5 gallons per minute per device. Bubblers for trees shall be placed on a separate valve unless specifically exempted by the Sandy City Public Utilities Department due to the limited number of trees on the project site.
- G. Sprinklers shall have matched Precipitation Rates with each control valve circuit.
- H. Check valves shall be required where elevation differences will cause low-head drainage. Pressure compensating valves and sprinklers shall be required where a significant variation in water pressure will occur within the irrigation system due to elevation differences.
- I. PVC Drip Irrigation lines shall be placed underground, poly drip irrigation lines shall be placed on top of soil but below mulch or otherwise permanently covered, except for Drip Emitters and where approved as a temporary installation. Filters and end flush valves

shall be provided as necessary.

- J. Irrigation zones with overhead spray or stream sprinklers shall be designed to operate between 11:00 p.m. and 6:00 a.m. to reduce water loss from wind and evaporation. Drip or bubbler zones are excluded.
- K. Program valves for multiple repeat cycles where necessary to reduce runoff, particularly slopes and soils with slow infiltration rates.

### 3.09 PLAN REVIEW

As part of the Plan Approval Process, a copy of the above information shall be submitted to the City for review and approval before construction begins. All Landscape plans submitted must be certified by a licensed Landscape Architect or approved Landscape Designer. The Irrigation Plans submitted must be certified by an approved Irrigation Designer or a Landscape Architect.

END OF SECTION

SECTION 07200

GRADING FOR LANDSCAPES

PART 1 GENERAL

1.01 SECTION INCLUDES

Materials and procedures for landscape grading.

1.02 RELATED WORK

- A. Section 02230: Granular Material, Flowable Fill & Topsoil
- B. Section 07800: Topsoil
- C. Section 01620: Storage and Protection

1.02 QUALITY ASSURANCE

Landscape grading is aesthetic by nature and subject to continual monitoring and modification during backfilling. Work closely with Engineer particularly when grading and constructing berms, channels, or other aesthetic structures.

PART 2 PRODUCTS

2.01 BACKFILL MATERIALS

- A. For fill areas which are to be landscaped, provide soils which comply with Section 02230.
- B. Topsoil: Refer to Section 07800.

PART 3 EXECUTION

3.01 PREPARATION

Identify required line, levels, contours, and datum.

3.02 PROTECTION

Protect existing trees, shrubs, lawns, existing structures, fences, roads, sidewalks, paving, curb and gutter, and other features. Refer to Section 07900

3.03 CLEANING

- A. Remove stockpiles from the site. Grade site surface to prevent free standing surface water.
- B. Leave borrow areas clean and neat.

END OF SECTION

SECTION 07300

PRESSURIZED IRRIGATION SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

Aboveground, underground, and drip irrigation systems complete with heads, valves, controls, and accessories.

1.02 RELATED SECTIONS

- A. Section 07600 - Vegetation Establishment Period.
- B. Section 03000 - Concrete Work.
- C. Section 03100 - Concrete Formwork
- D. Section 03200 - Concrete Reinforcement

1.3 REFERENCES

- A. ASTM A 53: Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- B. ASTM B 88: Copper Pipe.
- C. ASTM B 687: Brass, Copper, and Chromium-Plated Pipe Nipples.
- D. ASTM D 1784: Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated poly (Vinyl Chloride) (CPVC) Compounds.
- E. ASTM D 1785: Poly(Vinyl Chloride) PVC Plastic Pipe, Schedules 40, 80, and 120.
- F. ASTM D 2466 and D 2464: Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings; Schedules 40 and 80.
- G. ASTM D 2564: Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- H. ASTM D 2672: Joints for IPS PVC Pipe Using Solvent Cement.
- I. ASTM F 656: Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- J. ASSE 1013, 1015: Backflow Preventers, Pressure Reducers.
- K. NEC: National Electric Code. (Latest edition)
- L. Utah Plumbing Code: Section 1003.
- M. Detail LA-01: 2" or Less Mainline Connection
- N. Detail LA-02: Larger than 2" Mainline Connection
- O. Detail LA-10: Valve Assembly
- P. Detail LA-11: Valve Manifold
- Q. Detail LA-12: Drip Irrigation Valve
- R. Detail LA-13: Quick Coupler Valve
- S. Detail LA-20: Typical Sleeving Detail
- T. Detail LA 21: Sleeving Diagram
- U. Detail LA 22: Trench Detail
- V. Detail LA-30: Pop-Up Spray Head
- W. Detail LA-31: Pop-Up Rotor Head
- X. Detail LA-40: PVC to Poly Pipe Connection
- Y. Detail LA-41: Emitter into Poly-Tube
- Z. Detail LA-50: Pedestal with Controller
- AA. Detail LA-51: Wire Splice Detail

BB. Detail LA-52: Mini-click Detail

1.04 PERFORMANCE REQUIREMENTS

- A. Contractor shall provide documentation of the following:
  - 1. Contractor is licensed to perform landscape construction in the state of Utah.
  - 2. Contractor has been installing Sprinklers on commercial projects for ten previous years and has five projects of similar size as references.
  - 3. On site supervisor has five consecutive years of commercial irrigation installation experience. He or She shall be a current Certified Irrigation Contractor in good standing with the Irrigation Association. They must be on the project 85% of each working day.
  - 4. All laborers installing sprinkler must have the following certifications and carry them on the project at all times.
    - a. Training from IPS factory for Glue.
    - b. Training form Page Wire for wire install, wire connecting and grounding equipment
- B. Location of sprinkler heads: Design location is approximate.
  - 1. Adjust as necessary to avoid existing plants and other obstructions.
  - 2. At no time should the number of heads or valves for example be less than that indicated on the plans.
- C. Water Coverage:
  - 1. Head to head coverage in turf and other planting areas (100 percent).
  - 2. Do not increase or decrease number of heads or size of pipe indicated unless approved by Engineer.
  - 3. Meet the following Distribution Uniformity as determined through an irrigation audit pre-formed by an independent IA (Irrigation Association) certified Landscape Irrigation Auditor following IA Audit guidelines available from the Irrigation Association.
    - a. Spray Heads – 60%
    - b. Rotor Heads – 70%
- D. PVC Pipe: Must be stamped with certified NFS.
- E. If work is to continue after November 1 or resume before April 15, drain the system at the end of each work day. Do not permit water to remain in pipe overnight unless otherwise approved by the Parks Superintendent.
- F. Verify and have marked the location of all utilities and underground obstructions.

1.05 DEFINITIONS

- A. Mainline: The system of pipes that carry water from the Point of Connection (POC) to the valves.
- B. Lateral Lines: The system of pipes that carry water from the valves to the sprinkler heads and/or emitters.

1.06 SUBMITTALS

- A. Product Data: Manufacturer's technical data and installation instructions.
- B. Certificates of compliance to Engineer prior to installation.



- C. As-Built Drawings: Red-lined plan layout and details illustrating mainline and lateral lines location, size, and assembly. Include type and coverage of heads, wire runs not contained in mainline pipe trench, type of valves, controllers, fittings and accessories.
- D. Operating and Maintenance Data:
  - 1. Instructions covering full operation, care, and maintenance of system (an controls) and manufacturers parts catalog. Include drain procedures, blow out features for example.
  - 2. Instruct maintenance personnel in proper adjustment of sprinkler heads and use of special tools for adjustments.
- E. Keys:
  - 1. Gate Valve Key.
  - 2. Stop and Waste Valve Key: T-handle, rigid steel, 5 ft long minimum, key end to fit the stop and waste valve nut.
  - 3. Quick Coupler Valve Key Rainbird 44K and shall have hose swivel

## PART 2 PRODUCTS

### 2.01 PIPE AND FITTINGS

- A. Mainline: Solvent welded schedule 40 PVC through 4 inch, then Class 200 PVC. ASTM D 1784 and ASTM D 1785.
- B. Lateral line: Solvent welded schedule 40 PVC. Meet ASTM 1784 and ASTM D 1785.
- C. Pipe Fittings:
  - 1. Lateral Line: Solvent welded schedule 40 PVC. Meet ASTM D 2466.
  - 2. Main Line:
    - a. Solvent welded schedule 80 PVC. Meet ASTM D 2466.
    - b. Harco cast Iron or approved equivalent.
    - c. All cast iron fittings installed with joint restraints and/or thrust blocks.
- D. Valve Fittings: Schedule 80 Manifold system
- E. Risers: Threaded schedule 80 PVC. Meet ASTM D 2464.
- F. Copper Pipe: Type K as specified in ASTM B 88.
- G. Copper Fittings: Wrought or cast as specified in ASTM B 687.
- H. Poly and Vinyl Pipe
  - 1. Poly Irrigation Tubing conforming to the following sizes:

Size	ID	OD
1/2"	0.600	0.700
5/8"	0.720	0.830
3/4"	0.830	0.940
1"	1.060	1.200
1-1/2"	1.390	1.550
  - 2. 1/4" Vinyl Distribution tubing with an ID of .16" and an OD of .22"
- I. Poly Pipe fittings: Compression, Barbor Spin LOC sleeve feedings as recommended by poly pipe manufacture.

## 2.02 VALVES

- A. Automatic Control Valve - For inventory control purposes use only the following models of Automatic Control Valves in there appropriate application:
  - 1. Rainbird: PEB, PESB, 300BPE, 300BPES, XCZ-100 COM and/or XCZ-LF-100 PRF.
  - 2. Hunter ICV
- B. Master Valves - follow section 2.02 A. for master valves 3 inch or smaller. For Master Valves larger than 3 inches consult Parks Superintendent.
- C. Gate Valve - Resilient wedge: Milwaukee series 105 or equivalent, 200 psi rated (minimum) and sized according to main line.
- D. Ball Valve - Apollo or approved equal that is brass, 200 psi rated (minimum), sized according to main line and domestically made.
- E. Quick Coupler Valve - For inventory control purposes use only the Rainbird 44RC.
- F. Pressure Regulator - Use Wilkins Model 500 or 500FC or approved equal.

## 2.3 BACKFLOW PREVENTER

- A. Body and caps constructed of bronze with wear and corrosion resistant internal parts complete with bronze quarter turn ball valves.
- B. Reduced Pressure Principle Device (RP) as specified in ASSE 1013.
- C. Capable of being tested and serviced without removal of device from the line.

## 2.4 AUTOMATIC CONTROLLER

- A. General: A commercial grade controller manufactured expressly for control of automatic valves and underground irrigation systems and equipped with the following minimum features.
  - 1. 12-hour duration for any or all stations.
  - 2. Four programs, with eight start times each.
  - 3. Two master valve terminals, one programmable by station.
  - 4. 365-day calendar with leap year intelligence.
  - 5. Event day off option.
  - 6. Programmable rain delay.
  - 7. Water budget by program with adjustments from 0 to 300 percent in one percent increments.
  - 8. Capable of having total run time split into usable cycles.
  - 9. Station timing: 0 to 12 hours for all stations (0 to 16 hours with water budget at 300 percent); 0 to 120 minutes selectable in 1- minute increments; above 120 minutes selectable in 10-minute increments
  - 10. Manual or automatic operation.
  - 11. Non-volatile.
  - 12. Battery backup.
  - 13. Heavy-duty electrical surge protection.
  - 14. UL listed; CSA, CE approved
- B. On sites one acre or larger Use a Rainbird MAXI Com controller - Consult with Parks

- Superintendent for specifics
- C. Transformer: Capable of converting service voltage to control voltage in accordance with manufacturer's recommendations.
- D. Controller is to be installed on a dedicated electrical circuit - 15 amp minimum.

## 2.5 PEDESTAL

Free-standing stainless steel unit typically specified for the controller. Hardware included.

## 2.6 SPRINKLER HEADS

- A Fixed Riser
  - 1. ½ inch x 24 inch schedule 80 riser Male Pipe Threads (MPT).
  - 2. ½ inch shrub head adaptor Female Pipe Threads (FPT) x MPT.
  - 3. ½ inch FPT barbed swing pipe adapter.
- B Pop-up Spray Head - For inventory control purposes use only the following models with a minimum pop up height of 6 inches:
  - 1. Rainbird 1800 Series PRS.
  - 2. Toro 570 Z.
- C Rotary Head - For inventory control purposes use only the following models of Pop-up Rotor Heads
  - 1. Rainbird
  - 2. Hunter
  - 3. Toro
  - 4. Heads must include the following:
    - a. 5-inch minimum pop-up with water-lubricated gear driven design.
    - b. Integral rubber cover. - Purple if using non-potable water
    - c. Built-in check valve.
- D Pop-up Impact Head - Not allowed in Sandy Parks
- E. Above-ground Impact - Not allowed in Sandy Parks

## 2.7 PLASTIC NOZZLES

- A. Fixed Spray - use same manufacture as pop-up body
  - 1. Radius patterns and gal/min as shown on plans.
  - 2. Matched precipitation rates.
  - 3. Stainless steel adjustment screw.
  - 4. FPT to match 1/2 inch shrub head adapter.
  - 5. Pressure regulating: (Required on all fixed spray heads.)
  - 6. Filter screen.
- B. Bubbler - use same manufacture as pop-up body
  - 1. Made of high-impact plastic.
  - 2. Pressure compensating with adjustable flow and radius as shown on plans.
  - 3. 2 inch FPT.
  - 4. Attach to fixed riser or pop-up spray.
  - 5. Filter screen.

## 2.8 DRIP TUBING

- A. Self-cleaning, pressure compensating, polyethylene dripper line.
- B. Dripper discharge: 0.6 gal/hr to 0.9 gal/hr and choice of 12 inch, 18 inch, or 24 inch spacing.
- C. Pressure compensation range from 8 psi to 60 psi.
- D. 0.63 inch (16.1 mm) outside diameter; 0.54 inch (13.6 mm) inside diameter.

2.9 INDIVIDUAL DRIP EMITTERS - For inventory control purposes use only the following models of drip emitters

- A. Rainbird - XB pressure compensating emitters
  - TS-025 tubing stake
  - DBC-025 bug cap. Install flush cap at end of line in 10 inch round valve box.

2.10 LINE FLUSHING VALVE

- A. Made of high impact plastic.
- B. Maximum flow rate per flush valve: 15 gal/min.
- C. Automatic cleaning operation.
- D. Can be disassembled allowing for winterization blow-out.
- E. 1/2 inch MPT threads.

2.11 AIR/VACUUM RELIEF VALVE

- A. Brass body and cap and rated to 200 psi.
- B. Temperature resistant silicone disc seat.

2.12 Y FILTER

Part of the XCZ-100 COM assembly for flow rates of 3-20 GPM or the XCZ-LF-100 PRF assembly for flow rates of 0.2-3 GPM.

2.13 SWING PIPE

- A. Flexible Polyethylene Pipe: Maximum flow 6.0 gal/min. Inside diameter of 1/2 inch (.490 inch) with a wall thickness of 6/32 inch (.200 inch) and 80 psi rated excluding rotors.
- B. Pre-fab swing pipe: For flows exceeding 6 gal/min or attached to quick coupler. As manufactured by Lasco or approved equivalent .
- C. 1/2 or 3/4 inch Barbed Male Elbow: Plastic
- D. 1/2 or 3/4 inch Street Elbow: Marlex

2.14 VALVE BOX

Precast plastic with adequate hand room to operate small tools and provisions for locking cover to frame.

2.15 WIRE

- A. Provide wire for connecting remote control valves to the automatic controllers that is Type "PE", 600 V, stranded or solid copper, single conductor wire with PE insulation and bearing UL approval for direct underground burial feeder cable. Page wire P7079D or equal.
  - 1. Make all connections with UL approved type seal to make a waterproof connection.
  - 2. Where possible, bury wires in the same trench as the pipe.
- B. Provide wire with 0.045 inches insulation
  - 1. For wire sizes 14, 12, 10, and 8 use a single conductor solid copper wire, and for sizes 6 and 4 use stranded copper wire.
  - 2. Make control or "hot" wires red, common or "ground" wires white, "spare" wires orange and "tracer" wires yellow.
- C. Tape wire to main line every 10 feet.
- D. Provide 18 inch minimum wire loop at all changes of direction and 30 inches inside each valve box.
- E. Provide a separate common and tracer wire for each controller; and provide one spare wire for every 10 valves with a maximum of 10 spares.
- F. All wires not taped to the mainline must be installed in a conduit.

2.16 QUICK COUPLER - For inventory control purposes use only the following models

- A. Rainbird 44RC
- B. Install in a 10 inch round valve box, minimum
- C. Rainbird 44K - 1 inch brass valve key.
- D. Rainbird SH-1 3/4 inch brass swivel hose ell.

2.17 WASHED AGGREGATE

1-1/2 inch maximum with 100 percent retained on a No. 4 sieve.

2.18 JOINT PRIMER AND SOLVENT CEMENT

Weldon P-70 & 711 or approved equivalent.

2.19 ACCESS SLEEVE

2 inch, Schedule 40 PVC with a yellow plastic snug cap Aspen Earth AE-(2)SC or approved equal.

2.20 TEFLON TAPE

For use on threaded joints. Quality grade, 0.004 inch and domestically made.

2.21 CONCRETE THRUST BLOCKS

- A. Thrust blocks shall be provided as required. They shall be placed between undisturbed soil and the fitting to be anchored. The area of bearing on the pipe and on the ground in each instance shall be that shown on the drawings. The block shall, unless otherwise shown or directed, be so located as to contain the resultant thrust force so that the pipe and fitting joints will be accessible for repair.
- B. Concrete for thrust blocks shall have a compressive strength of not less than 2500 psi in 28 days.
- C. Care should be taken not to pour concrete around bolts and wires.
- D. Wrap irrigation pipe with a poly wrap before pouring thrust block.

### PART 3 EXECUTION

#### 3.1 EXCAVATION

- A. Stake pipe and sprinkler locations for approval.
- B. Excavate trenches for sprinkler system pipe to provide 18-24 inches of cover over main lines and 12-18 inches over lateral lines. Where trenching is required in proximity to trees that are to remain, refer to Section 07900.
- C. Barricade trenches within the clear zone and along pedestrian routes that are left open overnight.

#### 3.2 INSTALLATION

- A. General: Plans are diagrammatic. Proceed with installation in accordance with the following:
  - 1. Install stop and waste valves, backflow preventers and other equipment required by local authorities according to Utah Laws and Regulations to make system complete.
  - 2. Install main line, automatic control valves, lateral lines, fittings, and heads/drip line as specified.
  - 3. Thoroughly flush main lines before installing automatic control valves, and laterals before installing sprinklers. Flush supply lines thoroughly before installing backflow preventers or other regulating devices.
  - 4. After completion of grading, seeding or sodding, and rolling of grass areas, adjust heads to be plumb and flush with finished grades (flush is even with top of soil level or top of material level).
- B. Piping: Assemble all mainline and lateral lines in accordance with manufacturer's recommendations with no cul-de-sacs. Install PVC pipe in dry weather above 40 degrees F as specified by manufacturer's recommendations. Allow joints to cure a minimum of 8 hours before testing.
- C. Sleeving: Coordinate sleeving installation before placing pavement.
- D. Control Valves: Install at plan locations and according to detail. Use Schedule 80 PVC pipe for nipples on valve header, length as necessary. Install valves two maximum per each jumbo, plastic valve box and provide 30 inches of expansion loop slack wire at all connections inside valve box. Refer to Detail LA-11.

- E. Manual or Automatic Drains: **NOT ALLOWED.**
- F. Quick-Coupling Valves: Install using 1 inch Schedule 80 PVC nipples for risers and elbows. Locations as indicated on plans and at every valve complex.
- G. Back-flow Preventers: Install assembly using the details.
- H. Valve Access Boxes:
  - 1. Install over all automatic control valves, manual control valves, or zone shutoff valves and sized to provide adequate room for maintenance.
  - 2. Install valve boxes flush with finish grade and place parallel or perpendicular to adjacent curbs, sidewalks, or driveways.
  - 3. Imprint a valve control number on each valve box cover that corresponds to the valve controller (clock). Print the valve box number one inch high (minimum) in a permanent and legible manner.
  - 4. Place washed 1 ½ inch aggregate in sump as shown on details.
- I. Automatic Controller:
  - 1. Stake or mark controller location for approval.
  - 2. Mount the panel enclosure so adjustments can be conveniently made by the operator.
  - 3. Properly ground controller in accordance with Utah Laws and Regulations. Make all control wire connections to automatic controllers. Coordinate controller installation with electrical work.
  - 4. If pedestal controller is used, pour the concrete pedestal base with inserted conduits and bolts.
  - 5. Provide a laminated copy of the irrigation plan indicating valve station numbers and field locations and attach it inside the controller.
  - 6. Program the controller to provide the appropriate amount of water for each station.
  - 7. Supply the Engineer with manufacturer's warranties and operating instructions for the controller.
- J. Wire and Electrical Work:
  - 1. Use electrical control and ground wire suitable for sprinkler control cable of size indicated on plans.
  - 2. Tape control wires to underside of pipe at 10 ft intervals.
  - 3. Provide 18 inch minimum wire loop at all changes of direction and 30 inches inside each valve box.
  - 4. All wire not run in mainline trench shall be in conduit.
- K. Spray Heads, Fixed Risers and Bubblers:
  - 1. Install as per plans.
  - 2. Adjust sprinkler nozzles to allow for adequate coverage and minimize overspray onto walks, roads, driveways, and buildings.

### 3.3 TESTING

- A. Notify the Irrigation Supervisor 24 hours in advance of pressure testing the main line.
- B. Before backfilling and after air pockets have been vented from the lines, subject all supply and pressure irrigation lines to a hydrostatic pressure test by maintaining full supply line water pressure for 3 consecutive hours.

- C. Test connections for leaks prior to backfilling and repair all leaks. Lateral lines may be tested in sections to expedite backfilling work.

### 3.4 BACKFILLING OPERATION

- A. Bed all pipe 2 inch (minimum) surrounding the pipe with native material excavated from the trench and passing through a 1/2 inch sieve.
- B. Prevent soil, rocks, or debris from entering pipes or sleeves.
- C. Compact backfilled trenches thoroughly to prevent settling damage to grades or plant materials. Repair irrigation system and plants at no additional cost to Department.

### 3.5 IRRIGATION INSTALLATION INSPECTION

- A. All inspections require 24 hour notice to the Sandy City Parks Irrigation Supervisor. The Irrigation Supervisor must inspect all mainlines and laterals before burial. Failure to have an inspection will require the exposure of the piping.
- B. Perform an inspection and test of the Back-flow Device within 10 days of installation by an independent certified back-flow assembly tester.
- C. Perform an Irrigation Audit by a independent Irrigation Association certified water audit after the irrigation system is completely installed and fully functional.
- D. Make the required field adjustments and changes after the irrigation audit to meet the requirements of 1.04 B of this section. Re-audit sections as necessary.
- E. Notify the Engineer or Project Manager to schedule the inspection with the Irrigation Supervisor after the above requirements are complete. Provide the following at the inspection:
  - 1. Test results of installed Backflow device(s)
  - 2. Results of Irrigation Audit
  - 3. Completed 1 year warranty form
- F. Make the required field adjustments and changes after the inspection.
- G. Winterization. If the contractor has not completed construction by September 1, they will be responsible for proper winterization of irrigation system. Contractor shall contact Sandy City Parks Department for proper winterization techniques and procedures. These procedures include, but are not limited to:
  - 1. Winterization of the Irrigation System by the method of Blowing out with compressed air.
  - 2. Compressor shall be capable of a minimum of 175 CFM.
  - 3. Air pressure shall not exceed 75 PSI.
  - 4. The entire main and lateral line pipe shell have all the water evacuated from them.
  - 5. The Contractor is responsible for all repairs, including replacement of irrigation components.

END OF SECTION



SECTION 07400

SEED, TURF SEED, AND TURF SOD

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Seed, turf seed, and turf sod requirements and application.
- B. Surface preparation.

1.2 RELATED SECTIONS

Section 07700: Topsoil.

1.3 REFERENCES

Utah Seed Law: Utah Code - Title 4, Chapter 16.

1.4 SUBMITTALS

- A. Copy of the purchase order to the Engineer documenting that all seeds, including substitutions, have been acquired before the seeding window begins.
  - 1. For seeding schedule, refer to this Section, article, "Scheduling."
  - 2. The purchase order should list the common and botanical name for each seed species.
- B. Certification that turf sod is nursery grown.
- C. Certification indicating the date and time sod was cut at the nursery.
- D. Furnish fertilizer labels to Engineer.
- E. Through the Engineer, supply legible copy of Seed Certification Reports to Parks Superintendent.
- F. Seed certification: Include the following on seed certification reports and labels:
  - 1. Botanical name (include variety if applicable).
  - 2. Common name.
  - 3. Name of seed testing laboratory.
  - 4. Lot number and address of the seed company.
  - 5. Weed seed (percent).
  - 6. Other crop seed (percent).
  - 7. Inert matter (percent).
  - 8. Pure live seed (percent).
  - 9. Noxious weed seed (name and rate of occurrence).
  - 10. Date tested (month and year).
  - 11. Germination (percent).
  - 12. Hard seed (percent).
  - 13. Net weight (do not include container weight).

14. Pure live seed weight.
15. Collection locations for native shrub and tree species (state, county, elevation).

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver seed or turf seed to job site in original containers showing analysis of seed mixture, net weight, and date and location of packaging. Damaged packages are not acceptable.
- B. Strip turf sod from nursery no more than 24 hours before laying.
- C. Deliver fertilizer in containers showing weight, chemical analysis, and name of manufacturer. Store fertilizer in a weatherproof location.

## 1.6 SCHEDULING

- A. Pre-measure the area to be seeded before ordering seed from supplier. The Engineer must approve the measuring technique and determined quantity.
- B. Seeding Window: Complete all seeding within the appropriate seeding window.
  1. If the seeding is not completed within the given window, postpone seeding until the following year.
  2. Under certain conditions, an exception to this window may be obtained through the Parks Superintendent. The exception must be approved by the Engineer.

<u>Irrigated</u>	<u>Seeding Window</u>
YES	April 1 to Sept 15
NO	Sept. 15 to Dec 1

- C. Turf seed and turf sod can be placed only after irrigation system is installed, irrigation audit is completed, and irrigation meets the minimum distribution requirements and is operational at the controller.
- D. Topsoil: Refer to Section 07700.
  1. Place topsoil just before seeding to eliminate competition from weeds.
  2. Coordinate topsoil placement with the above seeding window.

## PART 2 PRODUCTS

### 2.1 SEED AND TURF SEED

- A. Meet the Utah Seed Law.
- B. Supply seed on a pure live seed (PLS) basis.
- C. Obtain seed from lots that have been tested by a state certified seed testing laboratory. (Association of Seed Analyst (AOSA) or Society of Commercial Seed Technologists (SCST). Seed germination tests older than 18 months for grass seed, and 9 months for shrub or tree seed are not acceptable.
- D. Do not use wet, moldy or otherwise damaged seed.

E. Seed Substitutions.

1. Before requesting a seed substitution, contact the major seed brokers in the state to verify that the seed is unavailable.
2. Have the Engineer contact the Parks Superintendent to verify the seed is unavailable and to recommend a seed substitution.
3. Replacement seed shall be of equal or greater cost to the originally specified seed.

2.2 TURF SOD

- A. Bluegrass Variety: Healthy and well-rooted nursery grown Kentucky Blue Grass sod comprised of a minimum of 3 varieties of Blue Grass and 2 varieties of Rye grass, to be approved by the Parks Superintendent, and free of weeds. Machine cut in straight, uniform strips or rolls, cut at a depth between 3/4 inch and 1 inch.
- B. Drought Resistant Variety: Healthy and well-rooted nursery grown sod machine cut in straight, uniform strips or rolls, cut at a depth between 3/4 inch and 1 inch. Grass varieties as approved by Parks Superintendent.

2.3 FERTILIZER (For turf sod and turf seed areas only)

Uniform in composition, dry and free flowing.

1. For turf seed or turf sod: Elemental nitrogen in granular form. Phosphorus and potassium are optional and may be applied with nitrogen in granules.
2. If hydro-seeding method is used, apply elemental nitrogen with a concentration ranging from 21-34 percent.

PART 3 EXECUTION

3.01 PREPARATION

- A. Complete all final grading, trench settling, topsoil placement, surface preparation, and irrigation work before seeding begins.
- B. Prepare General Seed bed (for all seeded and sodded areas).
  1. Before any seed or sod work begins, properly prepare the topsoil surface and have it approved by the Engineer. Refer to Section 07200.
  2. Do not work topsoil or seed when the soil is saturated or frozen.
- C. Prepare Turf Seed bed:
  1. Review finish grade to confirm that topsoil is 1 inch below the top of all walk curbs, mow strips and other hard surfaces.
  2. Apply fertilizer at the rate of 2 lbs per 100 square yards and mix thoroughly into upper 2 inches of topsoil.
  3. Do not apply fertilizer and seed at the same time in the same machine.
- D. Prepare Turf Sod Surface:
  1. Review finish grade to confirm that topsoil is 1-1/2 inch below the top of all walks, curbs, mow strips and other hard surfaces.
  2. Apply fertilizer at the rate of 2 lbs per 100 square yards and mix thoroughly into upper 2 inches of topsoil.

3. Level and roll seeded areas using an 21 gal water-filled hand roller containing 8 gallons to 10 gallons of water.
4. Just before laying the sod, lightly rake and dampen with water the top 1/8 to 5/8 inches of soil.

### 3.02 SEEDING

- A. Notify the Engineer seven working days before seeding.
- B. Apply seed at the rate indicated in the Seed Schedule shown in the plans.

### 3.03 DRILL METHOD

- A. Use the drill method of seeding on accessible slopes 3:1 and flatter.
- B. Use a rangeland type drill for non-turf areas or a Brillion type drill for turf areas equipped with the following:
  1. Depth band
  2. Seed box agitator
  3. Seed metering device
  4. Furrow opener
  5. Packer wheels or drag chains
- C. Provide the Engineer a copy of the manufacturer's directions on drill calibration two working days before seeding.
- D. Using the drill manufacturer's directions, and in the presence of the Engineer, calibrate the drill to apply seed at the rate indicated in the seeding schedule.
- E. Space drill rows a minimum of 6 inches and a maximum of 8 inches.
- F. Fill the seed box/boxes no more than half full when drilling on a slope.
- G. Set depth bands to drill seeds to a 1/2 inch depth.
- H. Drill making two complete passes. One along the contour and one at 30 degrees from the contour over the entire area to be seeded as indicated on the drawings.
- I. Maintain the drill at the calibrated setting throughout the seeding operation.
- J. Allow the furrows that are created by the drill to remain.

### 3.04 HYDRO-SEED METHOD

- A. Obtain approval of the Hydro-seed method by demonstrating the procedure on a 100 square yards area.
- B. Broadcast the seed using a hydro-seeder, apply seed, water and 300 lbs of cellulose fiber mulch (tracer) per acre.
- C. Do not seed during windy weather or when soil is saturated.

3.05 TURF SEEDING

- A. Apply turf seed. Refer to this Section, 3.03 Drill Method and 3.04 Hydro-seed Method.
- B. Roll seeded areas using a hand roller half filled with water. Rolling is not necessary if a Brillion type seeder is used.
- C. Lightly water and program the irrigation system to maintain a moist seed bed.
- D. Along walkways, rope-off newly seeded areas using bright plastic ribbon tape attached to stakes.

3.06 LAYING SOD

- A. Refer to this Section 1.6 Scheduling paragraph C.
- B. Place sod with all edges and joints tightly butted.
  - 1. Do not stretch or overlap sod.
  - 2. Keep length seams in a straight line.
  - 3. On slopes 4 to 1 or greater run long seam parallel to contours.
- C. Lay turf sod with staggered joints and trim off excess material along the edges.
- D. Roll sod immediately after placing using a hand roller half filled with water.
  - 1. Re-roll if depressions still remain.
  - 2. Thoroughly water with a fine spray to a depth sufficient that the underside of the new sod and soil immediately below the sod are thoroughly wet.

3.07 CLEANING AND MAINTENANCE

- A. Remove from site foreign materials such as containers, trimmings, over spray, dirt, and grass clippings collected during installation.
- B. Water and maintain the plants in a healthy condition until the final plant inspection. Refer to Section 07600 for vegetation establishment period.

END OF SECTION

## SECTION 07405

### NATIVE SEEDING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. This section includes requirements for native seed installation.
- B. Surface preparation.

##### 1.2 RELATED SECTIONS

Section 07000: Topsoil.

##### 1.3 REFERENCES

Utah Seed Law: Utah Code - Title 4, Chapter 16.

##### 1.4 SUBMITTALS

- A. Copy of the purchase order to the Engineer documenting that all seeds, including substitutions, have been acquired before the seeding window begins.
  - 1. For seeding schedule, refer to this Section, article, "Scheduling."
  - 2. The purchase order should list the common and botanical name for each seed species.
- B. Supply legible copy of seed certification reports to Parks Superintendent.
- C. Seed certification: Include the following on seed certification reports and labels:
  - 1. Botanical name (include variety if applicable).
  - 2. Common name.
  - 3. Name of seed testing laboratory.
  - 4. Lot number and address of the seed company.
  - 5. Weed seed (percent).
  - 6. Other crop seed (percent).
  - 7. Inert matter (percent).
  - 8. Pure live seed (percent).
  - 9. Noxious weed seed (name and rate of occurrence).
  - 10. Date tested (month and year).
  - 11. Germination (percent).
  - 12. Hard seed (percent).
  - 13. Net weight (do not include container weight).
  - 14. Pure live seed weight.
  - 15. Collection locations for native shrub and tree species (state, county, elevation).
- D. Installer shall be experienced in establishing un-irrigated native seed stands. Provide proof of three similar sized successful installations prior to commencing work.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

Deliver seed or turf seed to job site in original containers showing analysis of seed mixture, net

weight, and date and location of packaging. Damaged packages are not acceptable.

## 1.6 SCHEDULING

Seeding Window: Complete all seeding within the appropriate seeding window.

1. If the seeding is not completed within the given window, postpone seeding until the following window.
2. Under certain conditions an exception to this window may be obtained through the Parks Superintendent. The exception must be approved by the Landscape Architect.

Seeding Windows:                      March 15 to May 1  
   October 15 to freeze

## PART 2 PRODUCTS

### 2.1 NATIVE SEED

- A. Meet the Utah Seed Law.
- B. Supply seed on a pure live seed (PLS) basis.
- C. Obtain seed from lots that have been tested by a state certified seed testing laboratory. (Association of Seed Analyst (AOSA) or Society of Commercial Seed Technologists (SCST). Seed germination tests older than 18 months for grass seed, and 9 months for shrub or tree seed are not acceptable.
- D. Do not use wet, moldy or otherwise damaged seed.
- E. Seed:

Upland Grass Mix - for above bank line.

20% Canada Wild Rye  
25% Wheatgrass  
20% Slender Wheatgrass  
25% Indian Ricegrass  
10% Sand Dropseed

Riparian Grass Mix - within the bank line.

20% Basin Wildrye  
20% Slender Wheatgrass  
15% Blue Joint Reed Grass  
10% Tufted Hairgrass  
20% Metal Barley

Hydroseeding applications shall receive 25-30 lbs pls/sf. Ultimately quantity of seed shall be as required to establish acceptable stand of native grass.

- F. Mulch:
  1. 100% clean and weed free wood fiber.
  2. Apply 1500 - 2000 lbs per acre. On slopes steeper than 3:1 apply 2500 lbs per acres.
- G. Tackifier: Conwed 1000 or approved equal applied at 100 lbs per acre in hydroseeding application. Use 150 pbs per acre for slopes greater than 3:1.

- F. Fertilizer and other soil amendments. Add as required based on soils report.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Notify Parks Superintendent seven working days before seeding operations.
- B. In disturbed areas, complete all weed removal, final grading, trench settling, surface preparation and irrigation work before seeding begins.
- C. Roughen soil receiving seed.
- D. Do not install when seed or soil is saturated or frozen.

#### 3.2 SEEDING

Apply seed at the rate indicated in this Section.

#### 3.3 HYDROSEED METHOD

Following preparation of soil, mix seed, mulch and tackifier in a slurry at the specified rates, apply to all areas disturbed by contractor's activities.

#### 3.4 MAINTENANCE

- A. During the maintenance period the contractor shall be responsible for removing weeds and maintaining the site to provide as good of conditions as possible for seed to grow.
- B. Contractor shall plan on one re-seeding if the native stand has not established at the end of the warranty period.

END OF SECTION



SECTION 07500

TREES, SHRUBS, AND GROUND COVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

Furnishing and installing plant material.

1.2 RELATED SECTIONS

- A. Section 07800: Topsoil.
- B. Section 07600: Vegetation Establishment Period.

1.3 REFERENCES

- A. ANSI Z60.1: American Standard for Nursery Stock.
- B. Detail LA-60: Tree Planting and Staking
- C. Detail LA-61: Conifer Staking Detail
- D. Detail LA-62: Shrub Planting Detail

1.4 SUBMITTALS

- A. A copy of the plant purchase order indicating plant names, sizes, quantities, and unit prices. Submit within 90 calendar days from the Notice to Proceed.
- B. Plant substitutions:
  - 1. Obtain a signed statement from 3 wholesale nurseries, noted for stocking the specified plant(s), indicating that the plant(s) is unavailable.
  - 2. Submit to the Engineer the signed statements and a written request indicating the size and species of the unavailable plants and their suggested replacements.
  - 3. Substitutions will not be approved after 120 calendar days from the Notice to Proceed.
- C. All necessary inspection certificates for each shipment of plants as required by Utah Laws and Regulations.

1.5 QUALITY ASSURANCE

Reject plants not meeting ANSI specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Secure required plants at a nursery within 60 calendar days from the Notice to Proceed.
- B. Before site delivery, grow plants under full exposure to climatic conditions for a minimum of 60 calendar days.

- C. Notify the Engineer at least 14 calendar days before delivering the plants to the site.
- D. Deliver plant materials to the work site in covered vehicles just before placement.
- E. Maintain delivered plants in a healthy condition.
  - 1. Replace all wilted, wind-burned or stressed plants at no additional cost to the Department.
  - 2. Protect balled and burlapped root-balls from sun and wind by covering with soil or other suitable material if not planted within 48 hours of delivery.
  - 3. Plants are not to be stored on asphalt or cement for longer than 8 hours.

#### 1.7 PLANT INSPECTION AND ACCEPTANCE

- A. Replace unacceptable plant material within 14 days after notification from the Engineer.
- B. The plant inspection only occurs after all plant materials have been installed.
- C. The Engineer schedules the inspection date.
- D. Make the required field adjustments and changes following the inspection.

#### 1.8 SCHEDULING

- A. Install plants March 15 through October 15.
- B. Install non-irrigated plants in the fall after the plant is dormant and before the ground freezes.
- C. Install plants within 48 hours of arrival on site. A one week exception may be provided, with approval of the Engineer after consulting with the Parks Superintendent. Plants would have to be stored on a soft surface, healed in and watered a minimum of twice per day.

### PART 2 PRODUCTS

#### 2.1 PLANTS

- A. Supply healthy plants of the species and size specified, true to form, free from disfiguring knots, sun-scald, frost cracks, abrasions of the bark, and all forms of infestation and disease.
- B. Provide legible labels attached to all plants, flats, bundles, or other containers indicating botanical genus, species, and size.
- C. Supply trees with straight central leaders capable of standing upright without the support of stakes or guys.
- D. Establish fully in the container, container supplied plants.
- E. Use no balled and burlapped plants if the ball of earth surrounding roots has been cracked or broken or if the burlap is not secure.
- F. Use bare-root plant material as approved by the Engineer.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Verify that area prepared to receive plants is graded properly as per plan, all work is completed in the area, and that topsoil has been placed. Refer to Section 07200.
- B. Have the irrigation system installed and fully operational before installing plants. Individual drop emitters may be installed 24 hours after plants are installed.
- C. Stake or delineate locations of plants for approval before installation.

### 3.2 INSTALLATION

- A. General
  - 1. Install plants so that the top of the root ball is flush or 2 inches above the surrounding finished grade as per the planting details.
  - 2. Within one hour of installation, water the plants to saturate the root ball to a minimum of 4 inches below and around the plant hole. Add more backfill if settling occurs.
- B. Containerized Plants
  - 1. Excavate plant holes to twice the diameter and the same depth of the root ball.
  - 2. Carefully remove the plant from its container, scarify the sides and bottom of the root ball if needed and place it in the prepared hole.
  - 3. Place excavated soil in 4 inch lifts around the root ball and eliminate voids by tamping the soil between each lift.
  - 4. Stake containerized plants.
- C. Balled and Burlapped Plants
  - 1. Excavate plant holes to twice the diameter and the same depth less 2 inches of the root ball.
  - 2. With burlap securely intact, gently place the plant in the prepared hole.
  - 3. Mishandled or plants with broken root balls will be rejected.
  - 4. Remove the top two thirds (2/3) of the burlap and wire basket without disturbing the root ball.
- D. Tubelining Plants
  - 1. Auger a hole the same size as the tube.
  - 2. Immediately following excavation of the hole, gently place watered tubelining in the prepared plant pit so that the roots are not tangled, compacted, or curled up at the ends.
  - 3. Compress the soil at the base of the tubelining to eliminate voids between the root ball and existing soil.

### 3.3 TRANSPLANTING TREES

- A. Quality Assurance
  - Contractor shall have at least 5 years' experience in relocating large caliper trees.
- B. Job Conditions
  - 1. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

2. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Engineer before transplanting.
- C. Sequencing and Scheduling
1. Transplant trees in the fall in a dormant stage after the locations to which they are to be relocated have been prepared. Some demolition of paved surfaces may be required before transplanting can take place. Conditions vary by tree; the contractor shall verify conditions on the site.
  2. If transplanting must occur during a growing season all locations to which they are to be relocated must be prepared prior to transplanting. Transplanting must occur in one single operation. Once a tree has been spaded that tree must be immediately moved and replanted.
- D. Special Project Warranty
- Warranty of transplanted trees shall not be required provided that procedures are followed according to these specifications.
- E. Products
- Deadmen and Guys: Provide deadmen of sound new hardwood, treated softwood, or redwood, free of knot holes and other defects. Provide wire ties and guys of 2-strand, twisted, pliable galvanized iron wire, not lighter than 12 ga. with zinc-coated turnbuckles. Provide not less than 1/2 inch diameter rubber or plastic hose, cut to required lengths and or uniform color, material, and size to protect tree trunks from damage by wires.
- F. Execution
1. Contact Sandy City Parks & Recreation Urban Forester a minimum of two business days to coordinate transplanting of trees.
  2. Remove all impervious surfaces by hand digging or backhoe to accommodate the circumference of the spade blade.
  3. Prior to relocating the tree, dig a hole of the approximate size to receive the spaded root ball.
  4. Cut any roots over 2" in diameter with a saw or pruner.
  5. Remove large rocks.
  6. Using a tree spade, move the plant to the permanent location
  7. Place the transplant in the newly excavated hole. If transplant hole not dug with the spade backfill with excavated material before removing spade blade.
  8. Form a retention basin or water well the size of the rootball and at least 6" high around each tree.
  9. Immediately water the plant by thoroughly soaking the root mass and spray the foliage and trunk until thoroughly drenched. Fill the basin and allow it to soak in at least 3 times to assure that the rootball is saturated.
  11. Guy tree as directed by the Urban Forester using deadmen and wire as shown on details.
  12. Fill all depressions caused by removal of trees.
- G. Prune and thin-out trees by approximately one-third after transplanting. Prune out dead wood and broken, injured or diseased branches prior to transplanting. Maintain the

natural shape and appearance of the tree. Do not cut the leader or damage trunk in any way. Remove any trimmings from the site.

H. Maintenance for Transplanted Trees

When the landscape work is completed, including maintenance, the Urban Forester will, upon request, make an inspection to determine acceptability. After acceptance of transplanted tree the tree shall be maintained by owner.

3.4 CLEANING AND MAINTENANCE

- A. Remove from site foreign materials such as containers, burlap, and twine collected during installation.
- B. Remove any tags, labels, or other items attached to the plant material after final plant inspection.
- C. Water and maintain the plants in a healthy condition until the final plant inspection. Refer to Section 07600 for vegetation establishment period.

END OF SECTION

## SECTION 07600

### VEGETATION ESTABLISHMENT PERIOD

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

Establish and care for plantings requiring watering.

##### 1.2 RELATED SECTIONS

- A. Section 07300: Pressurized Irrigation Systems
- B. Section 07800: Topsoil and Mulch
- C. Section 07400: Seed, Turf Seed, and Turf Sod
- D. Section 07500: Trees, Shrubs, and Ground covers

##### 1.3 ESTABLISHMENT PERIOD

- A. A length of time during which the Contractor is responsible for caring for and establishing plant material installed on the project.
- B. The entire project shall be satisfactorily maintained for a period of thirty (30) days and the completion of at least four (4) mowings (once every 7 days), two hard edging (once every 14 days) and one application of fertilizer. The maintenance period will begin when all items of work have been completed as specified in the foregoing articles and to the satisfaction of the Parks Division. 30 days after initial inspection If project not accepted, contractor shall be required to continue maintenance until project is accepted. From October 31 to March 31 will be a period of no maintenance time elapsing.

##### 1.4 PAYMENT PROCEDURES

When a pay item is not provided in the contract, this work is considered incidental and payment is included in other items of work.

##### 1.5 QUALITY ASSURANCE

- A. The Department conducts three inspections to determine if the Contractor is satisfactorily performing work under the Establishment Period. The inspections occur at the Engineer's discretion.
- B. Replace in kind any dead or unacceptable plant or sod within four weeks of notification at no additional cost to the Department.
- C. At the end of the establishment period, and after all unacceptable plants have been replaced, the Engineer accepts the plants in writing the one year warranty will start.

#### PART 2 PRODUCTS Not Used.

#### PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Establish healthy trees, shrub ground-covers, and turf installed on the project.
- B. Replace any plant or sod that dies or is unacceptable during the establishment period with an identical plant at no additional cost to the Department.

### 3.2 PLANT CARE

- A. Watering:
  - 1. Pressurized irrigation system: When a pressurized irrigation system has been installed to establish plant material or turf, set the controller to apply the appropriate amount of water and make seasonal adjustments as necessary.
  - 2. Hand watering: If a pressurized irrigation system is not included in the project, then hand-water the plant to provide healthy plant material through the establishment period.
- B. Maintain weed-free plant basins or areas where mulch has been placed.
- C. Prune broken, dead or diseased branches to the next lead.
- D. Repair any non-functional water basins.

### 3.3 LAWN CARE

- A. Apply a 16-16-8 1%Fe (NPK ratio) fertilizer or other starter fertilizer approved by the Parks Superintendent a minimum of every 30 days.
- B. Control broadleaf weeds using a selective herbicide or physical removal as required.
- C. Repair and reseed or re-sod areas showing rodent or erosion damage.

### 3.4 LAWN MOWING AND TRIMMING

- A. When turf has established, begin mowing lawn a minimum of one time per week.
- B. Set mower to cut the grass at a 3-inch height. Keep mower blades sharp.
- C. Bag all grass clippings unless a mulching mower is used.
- D. After mowing, Hard edge along sidewalks, curbs and mow strips.
- E. After hard edging, trim along sidewalks, curbs and mow strips. Trim to the same height as the mower cuts (3 inches).

### 3.5 PRESSURIZED IRRIGATION SYSTEM

If an irrigation system is installed to establish plant materials or turf, the following is required:

- 1. Repair or replace any component that does not allow the irrigation system to operate properly. Use replacement parts of the same type and make.
- 2. Repair any erosion caused by leaking or broken irrigation equipment.
- 3. Repair any settling occurring around valve boxes or trenches.
- 4. If irrigation breaks or subsequent repairs damage installed plants, sod, or seeded areas, replace according to plan.

5. Winterize the system in the fall by turning off the water and blowing out all supply, main, and lateral lines using an air compressor with a maximum 80 psi, and following established procedures. Coordinate with the Engineer.
6. Replace at Contractor's expense any irrigation system component that breaks as a result of improper winterization.

END OF SECTION



## SECTION 07700

### TREE PRUNING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

Selectively remove and dispose of tree limbs.

##### 1.2 RELATED SECTIONS

Section 02121: Structures and Obstructions Removal

##### 1.3 REFERENCES

- A. ANSI A 300: Tree Care Operation- Tree, Shrub, and Other Woody Plants.
- B. ANSI Z 133.1: Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush- Safety Requirements.
- C. Current standards for pruning - International Society of Arboriculture. (ISA).

##### 1.4 SUBMITTALS

- A. Obtain necessary approvals from the city forester in which the work is performed, and submit a copy of the approval to the Engineer seven calendar days before beginning work.
- B. A copy of the arborist's certificate from I.S.A.

##### 1.5 QUALITY ASSURANCE

Contractor must provide an I.S.A. certified arborist to supervise tree pruning.

#### PART 2 PRODUCTS

##### 2.1 DISINFECTANT

Chlorine based.

#### PART 3 EXECUTION

##### 3.1 TREE PRUNING

- A. Conform to ANSI A 133.1.
- B. Prune trees following listed references.
- C. Remove tree branches extending over the roadway to provide a clear height of 14 ft above the paved surface and 8 ft above sidewalks.

- D. Spray pruning equipment with disinfectant after coming in contact with diseased plant material.
- E. Use the "Natural Target" or "Drop Crotch" pruning method when removing limbs.
- F. Do not top, pollard, stub, or dehorn any tree.
- G. Make all pruning cuts sufficiently close to the trunk or parent limbs without cutting into or removing the "branch collar" or the "branch bark ridge."
- H. Prune trees to make them shapely, symmetrical, and typical of the natural form of the species being pruned.
- I. Do not remove branches that would deform the appearance of the tree.

### 3.2 BRANCH DISPOSAL

- A. Shred removed branches into wood chips 2 inches or smaller.
- B. Remove all wood chips larger than 2 inches.
- C. Where feasible, aesthetically pleasing, and where placement will not be detrimental to vegetation growth, broadcast shredded branches over and around the site where trees are being pruned or removed.

END OF SECTION

## SECTION 07800

### TOPSOIL

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Furnish and spread topsoil on prepared areas.
- B. Strip topsoil from on-site locations and place in stockpile.
- C. Spread stockpiled topsoil on prepared areas.

##### 1.2 RELATED WORK

- A. Section 07400: Seed, Turf Seed, and Turf Sod.
- B. Section 07500: Trees, Shrubs, and Ground-covers.
- C. Section 07200: Grading for Landscaping

##### 1.3 REFERENCES

- A. AASHTO T 88: Particle Size Analysis of Soils.
- B. AASHTO T 194: Determination of Organic Matter in Soils by Wet Combustion.
- C. Textural Triangle National Soils Handbook, Part 603-5.

##### 1.4 SUBMITTALS

For Contractor-furnished topsoil: A minimum of seven working days before delivery of soil, submit to the Engineer the laboratory test results from each topsoil source to be used.

#### PART 2 PRODUCTS

##### 2.1 CONTRACTOR FURNISHED TOPSOIL

- A. Determine PH, EC, and SAR with a saturated soil paste or 1:1 soil/water testing method. Meet the following:
  - 1. PH: 6.0 to 7.5
  - 2. EC: (Electrical Conductivity): less than 4 ds/m.
  - 3. SAR: (Sodium Adsorption Ratio): less than 10.
- B. Organic matter:
  - 1. 5 to 20 percent.
  - 2. Determined by the release upon combustion, Walkley-Black or modified Walkley-Black testing method. AASHTO T 194.
- C. Textural classification:
  - 1. Loam, sandy loam, silt loam or sandy clay loam not exceeding the following percentiles. Refer to Textural Triangle National Soils Handbook, Part 603-5.

Soil component	Percentile Range
Sand	20 to 70
Silt	20 to 70
Clay	10 to 30

2. Determine particle size analysis by the hydrometer testing method.
- D. Topsoil free of:
1. Subsoils (no B or C horizon soils).
  2. Coarse sand and gravel.
  3. Stiff clay, hard clods or hard pan soils.
  4. Rock larger than 1/2 inches in any dimension.
  5. Trash, litter or refuse.
  6. Noxious weeds and weed seeds.
- E. Topsoil may contain a maximum of 5 percent rock smaller than 1/2 inches.

## 2.2 SOURCE QUALITY CONTROL - CONTRACTOR FURNISHED MATERIAL

- A. Obtaining Soil Samples:
1. Obtain soil samples while the Engineer is present. Provide no less than 0.5 lb per soil sample.
  2. Obtain samples from a thin slice of soil cut from the side of a freshly dug hole or by using a soil auger or sampling tube.
  3. Mix the several small samples taken from various places around the source together to produce a composite sample.
  4. More than one composite sample may be required if the topsoil horizon changes significantly across the source.
  5. Store samples in a clean container at room temperature and out of direct sunlight.
  6. Label the location and date on each sample container.
  7. Provide additional soil samples for verification if requested by the Engineer.
- B. Soil testing: Engineer will submit soil samples to an approved independent soil testing laboratory capable of performing the tests listed in paragraph 2.1 of this section. A partial list of acceptable testing laboratories includes:

Brigham Young University  
Soil and Plant Analysis Laboratory  
255 WIDB  
Provo, UT 84602  
(801) 378-2760

USU Extension - Soil Lab  
University Hill  
Logan, Utah 84322-4820  
(435) 797-2233

QA Consulting and Testing, LLC  
PO Box 627  
645 South 240 East  
Salem, UT 84653  
(801) 423-1116

### PART 3 EXECUTION

#### 3.1 GENERAL REQUIREMENTS

- A. Complete final grading, trench settling and surface preparation before placing topsoil.
- B. On steep cut slopes steeper than 2:1 and higher than 16 feet that require the placement of topsoil, place and spread topsoil as the slope is being constructed. Finish according to article, "Spread Stockpiled and Contractor-furnished Topsoil," paragraph D.
- C. On the remaining top soiled areas not covered under this article, line B, Contractor is responsible for providing a suitable topsoil surface just before seeding. Suitable topsoil surface is:
  - 1. Non-compacted surface finished according to article, "Spread Stockpiled and Contractor-Furnished Topsoil".
  - 2. Weed free.
- D. Finish grade provides a uniform surface with smooth transitions between grade changes and disturbed areas.
- E. Do not strip or handle wet topsoil.
- F. Establish finish grade at 1 inch below the top of all walks, curbs, mow strips and other hard surfaces for areas receiving seed or turf seed and 1-1/2 inch for areas receiving turf sod.

#### 3.2 STRIP AND STOCKPILE TOPSOIL

- A. Strip the topsoil
  - 1. Only from areas identified on the plans or approved by Engineer.
  - 2. To a depth approved by the Engineer.
- B. Remove and dispose of any roots larger than 2 inches in diameter or 12 inches in length.
- C. Stockpile stripped topsoil:
  - 2. At locations acceptable to the Engineer.
  - 3. So that placement or activity around the stockpile does not damage or impact any existing trees, shrubs or environmentally sensitive areas. Obtain appropriate clearances if such impacts are unavoidable.
- D. Grade to minimize erosion on and around the stockpiles.

#### 3.3 SPREAD STOCKPILED AND CONTRACTOR-FURNISHED TOPSOIL

- A. Clear area to receive topsoil of all trash, debris, weeds, and rock 3 inches or larger, and dispose of objectionable material in an approved manner.
- B. Place and spread the stockpiled topsoil over the prepared slopes to the plan depths.
- C. On slopes 3:1 and flatter, disc or harrow the placed topsoil along the contour, or cat-track

the slopes to create continuous cleat tracks that run parallel with the contours.

- D. On slopes steeper than 3:1, cat-track the slopes to create continuous cleat tracks that run parallel with the contours.

END OF SECTION

## SECTION 07900

### PROTECTION OF TREES, LAWNS AND LANDSCAPINGS

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

Section includes procedures for protection of existing landscape features.

##### 1.02 REFERENCE

Section: 07700: Tree Pruning

#### PART 2 PRODUCTS Not used.

#### PART 3 EXECUTION

##### 3.01 PROHIBITED ACTIVITIES ON OR AROUND PLANTED TREES, LAWN AND LANDSCAPED AREAS

- A. Traffic of any kind
- B. New construction of any kind including but not limited to utilities, concrete, asphalt, or brick within the greater of 18" or 10" for every 1" of diameter of the tree trunk measured four and one-half feet above the ground, unless otherwise approved by the Parks Superintendent or Urban Forester. If it is necessary to install underground utilities within the barrier area then they must be installed by boring or tunneling methods
- C. Change the grade around a tree as to shut off air, light or water from the roots.
- D. Pile building material, equipment or other substance on or near a tree, lawn and landscaping.
- E. Pour or spraying any injurious matter on or around a tree, lawn and landscaping.
  - 1. Post any signs, fastening any guy wire, cable, or rope to a tree
  - 2. Damage to branches of a tree outside of the designated barrier.

##### 3.02 BARRIERS TO INSURE PROTECTION

Any person doing construction, excavation, or demolition work in the near vicinity of a tree shall protect the tree from injury or damage with a substantial barrier.

- 1. The barrier shall be a minimum of 4 feet high
- 2. The barrier shall have minimum radius of the greater of the following:
  - a. Two foot radius
  - b. A distance in feet equal to the diameter of the tree trunk in inches measured four and one-half feet above the ground.
- 3. All building materials, extra dirt or other debris shall be kept outside the barrier
- 4. If construction needs to take place within the designated radius the barrier may be relocated while active construction is taking place and then reinstalled as soon as active construction is complete, unless otherwise approved by the Parks Superintendent or Urban Forester.

3.02 PRUNING

Any pruning is to be performed by or under the direct supervision of an ISA (International Society of Arboriculture) Certified Arborist. This would include repairing of all damage incidental or otherwise. Note: Damage to or destruction of tree is considered a Class C Misdemeanor. Refer to Section 07700: Tree Pruning.

3.03 PENALTY

Violation of the following will result in replacement of the Trees, Lawns and/or Landscaping. If an identical tree and/or shrubs in size and species cannot be reasonably obtained then, the contractor shall replace the tree with one that is acceptable to the Urban Forester. The contractor shall also pay the appraisal value of the tree to the City less the cost of the tree installed. The appraised value of the tree shall be based on the condition of the tree before construction was started and shall be determined in accordance with the latest edition of the "Guide for Plant Appraisal" as published by the International Society of Arboriculture.

END OF SECTION